

May 20065.

## CHEMISTRY 4335, MARK SCHEME

### Paper 1F

- |    |     |                       |   |
|----|-----|-----------------------|---|
| 1. | (a) | electron              | 1 |
|    | (b) | electron              | 1 |
|    | (c) | protons and neutrons  | 1 |
|    | (d) | protons and electrons | 1 |
|    | (e) | neutron               | 1 |

Total 5 marks

- |    |     |                                        |   |
|----|-----|----------------------------------------|---|
| 2. | (a) | atomic number / proton number          | 1 |
|    | (b) | (relative) atomic mass NOT mass number | 1 |
|    | (c) | 1 / alkali metals                      | 1 |
|    | (d) | 6                                      | 1 |
|    | (e) | 4 / 5 / 6                              | 1 |

Total 5 marks

- |    |     |                                                                                                                    |                                        |   |
|----|-----|--------------------------------------------------------------------------------------------------------------------|----------------------------------------|---|
| 3. | (a) | (i)                                                                                                                | 5                                      | 1 |
|    |     | (ii)                                                                                                               | carbon dioxide + water → carbonic acid | 1 |
|    | (b) | fizzy drinks / carbonated drinks<br>fire extinguishers<br>dry ice (for refrigeration)<br>Accept other correct uses | } any two                              | 2 |
|    | (c) | O=C=O<br>ALLOW dot and cross diagram with/without non-bonding electrons                                            |                                        | 1 |

Total 5 marks

- |    |     |            |                                     |   |
|----|-----|------------|-------------------------------------|---|
| 4. | (a) | metals     | } these two can be in reverse order | 1 |
|    |     | non-metals |                                     | 1 |
|    |     | gained     |                                     | 1 |
|    |     | lost       |                                     | 1 |
|    |     | high       |                                     | 1 |
|    |     | high       |                                     | 1 |
|    | (b) | (i)        | 2.8.2 and 2.8.7 (either way round)  | 2 |
|    |     | (ii)       | 2.8 and 2.8.8 (either way round)    | 2 |

Total 10 marks

5. (a) B A May use 'solid' 'liquid' 'gas' 1  
 B C if suitable key given. 1  
 A C 1  
 C A 1
- (b) B / liquid 1
- (c) tick to show element 1  
 tick to show mixture 1  
 tick to show mixture 1  
 tick to show compound 1

Total 9 marks

6. (a) (i) s aq aq g 2  
*Five correct= (2); four or three correct= (1); two or fewer= (0)*
- (ii) copper(II) carbonate - (light/dark/pale) green 1  
 copper(II) sulphate - (light/dark/pale) blue NOT royal blue 1
- (iii) effervescence / fizzing / bubbles NOT gas formed 1  
 ALLOW solid disappears/dissolves
- (b) a carbonate } these two can be in reverse order 1  
 an acid } 1  
 a salt 1  
*(this sentence must make chemical sense)*  
 neutralisation 1
- (c) (i) to neutralise/react with all the acid / use up the acid 1  
 (ii) filtration / filtering 1
- (d) crystallisation ALLOW leave in warm place 1

Total 12 marks

7. (a) (i) heat ALLOW warm or reference to flame NOT burn / Bunsen 1  
 (ii) turns white / paler 1  
 condensation / droplets / liquid / steam NOT water vapour 1
- (iii) 'hydration' box ticked 1
- (b) (i) measure the freezing / boiling point 1  
 (ii) 0°C / 100°C 1
- (c) (i) acid rain 1  
 (ii) stonework/buildings eroded/eaten away NOT corroded } any 2  
 trees/plants/ crops harmed/killed } two  
 fish harmed / killed NOT animals }

Total 9 marks

8.

Material	Use	Property
aluminium	Overhead electricity cables / coins / window frames	Good conductor of electricity / resists corrosion
copper	Overhead electricity cables / coins	Good conductor of electricity / resists corrosion
poly(chloroethene)	Insulation on electrical wires / window frames	Does not conduct electricity / resists corrosion
poly(ethene)	Injection moulding	Low melting point

Total 5 marks

9. (a) (i) calcium 1
- (ii) limewater 1  
milky / cloudy / white ppt 1
- (iii) carbonate 1
- (b) (i)  $\text{Fe}^{2+}$  1
- (ii) iron(II) hydroxide 1
- (iii) sulphate 1
- (iv)  $\text{BaSO}_4$  1
- (c) any two from chloride / bromide / iodide 2
- (d) (i)  $\text{CaCO}_3$  1
- (ii)  $\text{FeSO}_4$  1

Total 12 marks

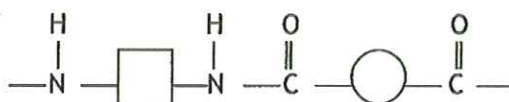
10. (a) (i) air 1  
natural gas / oil NOT methane 1
- (ii)  $450^\circ\text{C}$  ( $\pm 50^\circ\text{C}$ ) 1  
200 atm ( $\pm 50$  atm) 1  
iron (catalyst) 1
- (iii) liquefied / cooled / condensed 1
- (iv) recycled / fed back into reactor 1
- (b)  $\text{NH}_3 + \text{HNO}_3 \rightarrow \text{NH}_4\text{NO}_3$  or  $\text{NH}_4\text{OH} + \text{HNO}_3 \rightarrow \text{NH}_4\text{NO}_3 + \text{H}_2\text{O}$  2  
formula of reactants (1 mark); formula of products (1 mark)  
incorrect balance maximum 1

Total 9 marks

11. (a) BITUMEN: (waterproofing) roofs / roads / tarmac 1  
KEROSENE: (fuel for) aircraft/ stoves / lamps 1
- (b) (i) gasoline + oxygen → carbon dioxide + water 1  
ALLOW petrol / octane as reactant
- (ii) insufficient/limited oxygen / air 1
- (iii) carbon monoxide 1  
toxic / poisonous 1  
reduces ability of blood to carry oxygen / mention of 1  
(carb)oxyhaemoglobin
- OR
- carbon / soot (1 mark)  
specified effect on lungs / respiratory system (1 mark)
- (c) heat / boil 1  
suitable apparatus (container to heat in; condenser; thermometer) - 1  
can be shown in diagram  
collect sample boiling between 80°C and 120°C (depends on 1  
apparatus)

Total 10 marks

12. (a) condensation 1
- (b) (i) (di)amine ALLOW amino 1
- (ii) (di)carboxylic acid 1
- (iii) alternating circle and square 3  
correct linkage between blocks (NH-CO- is minimum)  
two NH and CO groups in correct positions is minimum



must have 'continuation bonds' for 3<sup>rd</sup> mark  
ALLOW terminal COOH or NH<sub>2</sub> if brackets used round repeat unit

- (c) low 1  
weak 1  
molecules 1

Total 9 marks